



Paul E. Helliker
Director

Department of Pesticide Regulation



Gray Davis
Governor
Winston H. Hickox
Secretary, California
Environmental
Protection Agency

August 15, 2003

WHS 03-06

TO: COUNTY AGRICULTURAL COMMISSIONERS

SUBJECT: WORKER HEALTH AND SAFETY ROLES, RESPONSIBILITIES, AND
PRIORITIES FOR ILLNESS INVESTIGATIONS AND WORKPLACE
EVALUATIONS

The Department of Pesticide Regulation (DPR) has a long history of assisting county agricultural commissioners (CAC) with investigations of pesticide-related illnesses and injuries. In addition to working with the Enforcement Branch, CAC staff have contacted the Worker Health & Safety Branch (WHS) to request assistance in interviewing people with pesticide-related symptoms and sample collection. WHS scientists have collected dislodgeable foliar residue, air, surface and biological (e.g., urine) samples to determine whether exposures occurred. WHS scientists have contacted the CAC to coordinate the collection of health-based information as part of investigations and the initiation of workplace evaluations. Finally, DPR's Medical Consultant has been involved in various aspects of illness investigations.

This letter summarizes WHS' roles and responsibilities pertaining to pesticide-related illness and injury investigations, the resources WHS can offer the CAC, and our investigation priorities for fiscal year (FY) 2003/04 (Attached). I have also attached recent examples of WHS investigative activities, conducted collaboratively with the CAC and Enforcement Branch, to assist you in understanding our role in pesticide-related episodes of illnesses and injuries. I plan to attend your area group meetings during FY 2003/04 to provide an overview of the Pesticide Illness Surveillance Program (PISP) and discuss our involvement in episode investigations.

Roles and Responsibilities

The CAC has lead responsibility for investigating complaints and episodes of pesticide-related illnesses and injuries. Generally, WHS and the Enforcement Branch each have supporting roles in these types of investigations. (Under special circumstances, the Enforcement Branch will take the lead on an investigation.) Key objectives of an investigation are to determine whether any pesticide laws or regulations were violated, document the exposure, and determine the circumstances that contributed to the exposure event. However, our primary investigation objectives may differ. The primary objectives of the CAC and Enforcement Branch are to determine what happened, identify possible violations and take appropriate enforcement action.

FLEX YOUR POWER! *The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web site at <www.cdpr.ca.gov>.*



The primary objectives of WHS are to document the exposure, determine the circumstances that contributed to the exposure event, and determine whether occupational health hazards exist, and evaluate exposure mitigation measures. The CAC, Enforcement Branch and WHS investigative strategies are implemented collaboratively and cooperatively so that we each achieve our primary objectives.

WHS is responsible for the following activities related to illness and injury investigations:

1. As part of the PISP, evaluate human effects episodes involving pesticide exposure, illness, or injury to determine what happened, characterize the extent of pesticide exposures, and determine whether occupational health hazards exist. (This may include an on-site evaluation.)
2. Conduct workplace evaluations and consultations to evaluate the extent of potential pesticide exposures and occupational health hazards.
3. Develop mitigation measures in response to human health and occupational hazards.
4. Assess the effectiveness of the mitigation measures in reducing pesticide exposures.

Investigative Consultation and Services

DPR's Medical Consultant and WHS scientists provide consultation and services to assist the CAC in their investigations. In 2001, I sent you a letter explaining the services available. For example, the Medical Consultant can assist in medical triage during an investigation (e.g., consulting with the treating physician or medical personnel to assist them in diagnosing a pesticide-related illness, consult with medical personnel regarding urine and blood sample collection, conduct on-site interviews of persons exposed to pesticides).

WHS scientists can provide technical information related to pesticide exposure and toxicology, and have expertise in sampling different media, interviewing affected parties, and evaluating workplace hazards. We are available to help the CAC in conducting Spanish and English speaking interviews and in various types of data and sample collection and exposure monitoring. However, your Senior Liaison should be the first contact for assistance in the investigation for conducting interviews, and collecting and transporting samples. If you need additional resources in these areas, your Senior Liaison will coordinate with us to request assistance. For more information about DPR's Medical Consultant's and WHS scientist's services, please review WHS 01-02.

WHS Priorities for Investigation

As part of our planning process for fiscal year 2003/04, I have identified priorities for our participation in episode investigations. WHS establishes priorities in response to potential health hazards identified during previous investigations of pesticide illnesses and exposures, trends analyses of Pesticide Illness Surveillance Program (PISP) data, and evaluations of regulatory requirements and mitigation measures. I have identified the following priorities for FY 2003/04 for our involvement in episode investigations:

1. Episodes that appear to be linked to a terrorist attack
2. Priority episodes involving drift
3. Priority episodes involving soil fumigants (Industrial Hygiene Program)
4. Priority episodes in enclosed spaces or indoor settings (Industrial Hygiene Program)
5. Episodes involving worker entry during the restricted entry interval (Follow-up to HS-1781 and HS-1819 - posting evaluation and notification reports)
6. Episodes involving irrigators (Follow-up to HS-1781 and HS-1819 - posting evaluation and notification reports)
7. Episodes involving the following 6 pesticides identified in HS-1819 (posting evaluation report) that may have reduced protections following the implementation of Worker Protection Standards (WPS):

Pesticide	Reduced Protection
Cyfluthrin	Shorter REI
Dimethoate	Some REIs shorter, reduced posting
Methidathion	Reduced posting requirements
Methomyl	Reduced posting requirements
Oxamyl	Reduced posting requirements
Phorate	Reduced posting requirements

8. Episodes involving handlers in which no violations of existing regulations were identified (Follow-up to HS-1824 - WHS will evaluate the completed investigative report prior to any follow-up activity)
9. Episodes involving closed systems (Follow-up to HS-1849)

County Agricultural Commissioners
August 15, 2003
Page 4

In addition to providing assistance on CAC investigations through your Senior Liaison, WHS wants to be informed when an episode occurs that meets any of the criteria above. Should you become aware of an episode, please contact Sue Edmiston of my staff at (916) 445-4278. WHS will consult with you and determine whether we want to participate in the investigation. After making a determination to participate, we will coordinate our investigative activities with CAC and Enforcement Branch staff.

If we become aware of an episode listed above and are interested in participating, my staff will coordinate with the Enforcement Branch and CAC before any WHS investigative activities are conducted. In some instances, we will not initiate any WHS investigative activities until the CAC investigative report is received.

I look forward to meeting with you in the near future to discuss the PISP and our involvement in illness and injury investigations. If you have any questions about WHS roles and responsibilities, or our priorities for FY 2003/04, please contact Sue Edmiston of my staff at the number listed above.

Sincerely,

[original signed by S. Edmiston for C. Andrews]

Charles M. Andrews, Chief
Worker Health & Safety Branch
(916) 445-4222

Attachment

cc: Dan Merkley, Agricultural Commissioner Liaison
Scott Paulsen, Enforcement Branch
Sue Edmiston, WHS

Recent Examples of Collaborative Investigations: Exposure Monitoring Program

1997, Cyfluthrin in Oranges (17-TUL-97)^{1,2,3}

In April 1997, DPR approved a full registration for cyfluthrin on citrus that reduced the pre-harvest interval from 150 days to day of harvest. Prior to this time, cyfluthrin applications close to harvest were illegal. In early May, DPR received reports of respiratory illnesses involving navel orange harvesters in Tulare County. Cyfluthrin has a restricted entry interval (REI) of 12 hours and the illnesses occurred between three and eleven days post-application. The CAC and Enforcement (ENF) investigated the incidents and enlisted WHS assistance to conduct worker interviews. WHS' medical consultant also participated in interviews and in collecting and coordinating medical information. The CAC found one violation, which did not directly contribute to the exposures.

WHS suspected a workplace health hazard related to cyfluthrin residues and conducted two separate studies. WHS collected dislodgeable foliar residue samples (DFR) from eight orange groves in a 25-mile radius of the incident fields, from time of application to two months' post-application, to characterize cyfluthrin residue dissipation. We found variable residue dissipation, with significant cyfluthrin residues present in some groves up to 60 days post-application. WHS also conducted an inhalation monitoring study of commercial harvesters. The workers picked for 6 hours in a grove treated with cyfluthrin 30 hours prior. Inhalation exposures were below those associated with known effects in animal studies. WHS recommended that a human irritation threshold be established for cyfluthrin.

Cyhalothrin in Grapes, 1999 (44-FRE-99)^{4,5}

In September of 1999, a crew of raisin harvesters in Fresno County developed sneezing, flu-like symptoms and itching skin in a field treated with sulfur and propargite. Dislodgeable foliar residue (DFR) samples analyzed by the WHS lab confirmed cyhalothrin residues. Use of cyhalothrin on grapes is not legal. In comparing the cyhalothrin residues with those from published studies, WHS found the DFR was more than ten times above the levels previously found for other crops. Sample results confirmed propargite residues exceeded estimated safe levels, though reentry had taken place 15 days after the 30-day REI had expired. The Fresno CAC declared the episode field a hazardous area and prohibited employee entry pending consultation with DPR regarding appropriate medical supervision and personal protective equipment. WHS conducted additional sampling to characterize propargite, sulfur and cyhalothrin residues in area grape vineyards near expiration of the REI (30-35 days post-application). All 120 samples had propargite residues, and 72% were below the estimated safe level. Cyhalothrin was not detected in any of 120 samples. WHS determined that cyhalothrin residues were the primary cause of the illnesses and issued a memo prohibiting employee reentry for the remainder of the season, requiring posting against reentry until natural defoliation had occurred, and recommended personal protective equipment, including boots, particulate respirator, disposable coveralls and gloves be worn by family members who entered the vineyard. The Fresno CAC issued Agricultural Civil Penalties of \$1,000 each (\$2,000 total in penalties) to the pest control business and applicator for violations related to this illness episode.

Carbofuran in Cotton, 1998 (20-FRE-98)^{6,7,8,9}

Thirty-four members of a weeding crew became ill when they entered an unposted field treated two hours earlier with carbofuran, mepiquat chloride and abamectin. Carbofuran, an N-methyl carbamate pesticide, has an REI of two days and field posting is required. Staff from the Fresno CAC, ENF, WHS and the California Department of Health Services interviewed the workers. Potential contributing factors included the following: the cotton plants were wet, several workers pulled the weeds barehanded, and many workers did not wash before eating because wash water and towels were ½ mile away.

Blood samples drawn at the hospital showed red blood cell cholinesterase was depressed in all ten samples properly analyzed. WHS submitted DFR samples, worker urine samples and worker clothing to the WHS lab for evaluation of carbofuran residues/metabolites. All urinalyses were positive for three carbofuran metabolites. All DFR samples were positive for carbofuran, as were eight of the nine clothing items. Linear regression analysis of urine metabolites vs. clothing residues was significant ($r^2 = 0.93$, $p = 0.04$).

Lack of communication between the grower, applicator and labor contractor resulted in not posting the field and early entry. The Fresno CAC levied Agricultural Civil Penalties in the amount of \$16,232 for violations related to this illness episode. This episode, and other similar, though less severe incidents, prompted the recent WHS evaluations of field posting and notification requirements.

Tribufos in Cotton, 1999 (49-KER-99)^{10,11}

Eight female fieldworkers became ill when they entered a cotton field to conduct roguing activities approximately five hours after aerial treatment with tribufos. The REI for roguing was 24 hours. Permit conditions placed ten days earlier prohibited field entry for harvest, tramping and raking activities for ten days following tribufos applications, but did not address field entry for roguing. CAC and ENF enlisted WHS assistance to collect DFR and worker clothing samples. WHS' medical consultant provided guidance to the attending physician for several months following the episode, as several workers had persistent symptoms. The Kern County CAC identified six violations that contributed directly to the exposures and issued Agricultural Civil Penalties of \$4,208 and \$1,405 to the grower and crop dusting service, respectively, for violations related to this illness episode.

Chlorpyrifos and Propargite in Grapes, 2000 (22-TUL-00)^{12,13}

A crew of 24 female workers tying vines in a young vineyard became ill after being drifted on by a helicopter making an application to an adjacent almond orchard. WHS assisted the CAC in collecting gradient DFR samples in both the almonds and grapes and transported DFR, urine and clothing samples to the lab. DFR and clothing results confirmed drift of both pesticides to the vineyard.

WHS' Medical Consultant determined that the pesticide levels were of marginal concern for repeated exposures from a high contact work activity such as harvesting in a fully mature canopy. However, the canes in this vineyard were young, with few leaves, and tying is a low contact activity. ENF staff's digital photographs of the vineyard were crucial in documenting the maturity of the vines and helping the medical consultant reach this determination without

necessitating a visit to the vineyard. The field was released with no restrictions a week after the incident. The Tulare CAC issued five Violation Notices (three violations directly contributed to the exposures) and issued Agricultural Civil Penalties for a total of \$3,965.

Recent Examples of Collaborative Investigations: Industrial Hygiene Program

Industrial Hygiene Program (IH) scientists have collaborated with CACs to evaluate closed system devices and chlorine delivery systems for pools, provide training in respiratory protection, conduct on-site sampling and evaluation related to copper naphthenate illnesses, and provide consultation regarding appropriate personal protective equipment (PPE) for specific exposure scenarios.

Commodity Fumigation Facility Evaluations^{14,15,16,17}

Following a priority illness related to DDVP exposure (28-MER-02), Merced County CAC consulted with WHS IH staff regarding the incident. IH staff conducted a workplace evaluation of the facility and made recommendations to resolve several conditions that were out of compliance. Additionally, they noted problems with chamber fumigations that could compromise the facility's ability to meet methyl bromide permit conditions. They informed staff from DPR's Environmental Monitoring Branch who subsequently evaluated the facility and recommended several changes to their operations. IH staff also analyzed methyl bromide data collected by an environmental consulting firm during an eight-hour work shift at this site. Along with CAC staff, WHS conducted evaluations at a total of three nut-processing plants. IH staff made specific recommendations for each facility that assisted the CAC in bringing fumigators into compliance with methyl bromide permit conditions. IH staff conducted a follow-up evaluation at the illness site to assure the recommendations were adopted.

Chlorine Dioxide Evaluations¹⁸

Also in consultation with Merced CAC, IH staff assisted in investigating four non-priority illnesses that occurred at a food packing facility. CAC and WHS conducted a site evaluation and found no obvious causal conditions. However, IH staff recommended certain steps for the facility to take to reduce the chance that illnesses of a similar nature would recur.

Copper Naphthenate Evaluations¹⁹

Responding to concerns raised by Dr. Michael O'Malley, WHS' Medical Consultant, over a potential copper naphthenate exposure in a residential structure, IH staff initiated an air and surface monitoring study of the home in question. The material had been misapplied to the bathroom wall studs, an indoor application prohibited by the copper naphthenate label. Dr. O'Malley had reviewed the blood tests of the resident and had determined the resident appeared to have considerably elevated copper levels in her bloodstream. Air monitoring for naphthenic acids and organic solvents was performed, as well as surface sampling for elemental copper. Organic solvent levels were unremarkable. Because of analytical problems encountered by the chemistry laboratory, naphthenic acid levels could not be ascertained. The copper residue on the kitchen surfaces, and the lack of corresponding residue in the bathroom, provide inconclusive evidence for copper naphthenate contamination. The kitchen residue of copper, like

the solvent residue in the air, may be associated with other consumer goods (copper clad cookware, wiring, water pipes, coinage, etc.).

References

1. Priority Investigation Number 17-TUL-97. (1997) California Department of Pesticide Regulation, Enforcement Branch
2. Edmiston, S., Spencer, J., Hernandez, B., Fredrickson AS, Powell, S. (1999) Dissipation of Dislodgeable Foliar Cyfluthrin Residue, HS-1778. California Department of Pesticide Regulation, Worker Health and Safety Branch
Accessed at <http://www.cdpr.ca.gov/docs/whs/pdf/hs1778.pdf>
3. Edmiston, S., Spencer, J., Hernandez, B., Fredrickson AS. (1998) Inhalation Exposure of Orange Harvesters to Cyfluthrin Residue, HS-176. California Department of Pesticide Regulation, Worker Health and Safety Branch. Accessed at <http://www.cdpr.ca.gov/docs/whs/pdf/hs1765.pdf>
4. Fresno County Agricultural Commissioner's Office (2000) Lotus Farms Investigation, Priority Investigation Number 44-FRE-99. California Department of Pesticide Regulation, Enforcement Branch.
5. Spencer, J. (2000) Branch Activities and Result of Analyses From Our Involvement in the Investigation of 44-FRE-99 (Project 9904), HSM-00008. California Department of Pesticide Regulation, Worker Health and Safety Branch
6. Fresno County Agricultural Commissioner's Office (1999) Cantua Farms, Furan Exposure July 31, 1998, 20-FRE-98. California Department of Pesticide Regulation, Enforcement Branch.
7. Edmiston S, Schneider F, Hernandez B, Fredrickson S, Quan V. (1999) Exposure and Illness Following Early Reentry into a Carbofuran-Treated Field, HS-1779. California Department of Pesticide Regulation, Worker Health and Safety Branch
8. Spencer, J. (2001) Analysis of the Impact of the Federal Worker Protection Standard and Recommendations for Improving California's Worker Protection Program Regarding Field Posting, HS-1819. California Department of Pesticide Regulation, Worker Health and Safety Branch
9. McCarthy, S. (2002) Analysis of the Hazard Communication, Notification and Retaliation Requirements of the Worker Protection Standard and Recommendations for Improving California's Worker Protection Program, HS-1833. California Department of Pesticide Regulation, Worker Health and Safety Branch
10. Kern County Agricultural Commissioner's Office, Priority Investigation Number 49-KER-99. (2000) California Department of Pesticide Regulation, Enforcement Branch
11. Spencer, J. (2000) WH&S Branch Activities and Results of Analyses Related to the Investigation of 49-KER-99 (Project 9905), HSM-00004. California Department of Pesticide Regulation, Worker Health and Safety Branch
12. Tulare County Agricultural Commissioner's Office, Priority Illness Episode 22-TUL-00. (2000) California Department of Pesticide Regulation, Pesticide Enforcement Branch
13. Spencer, J. Branch Activities and Results of Analyses Related to the Investigation of 22-TUL-00 (Project 00001), HSM-01015. California Department of Pesticide Regulation, Worker Health and Safety Branch

14. Merced County Agricultural Commissioner's Office, Priority Illness Episode 28-MER-02. (2002) California Department of Pesticide Regulation, Pesticide Enforcement Branch
15. Fong, H. (2002) Worksite Inspection of Sanfilippo Facility Associated with 28-MER-02, HSM-02017. California Department of Pesticide Regulation, Worker Health and Safety Branch
16. Fong, H. Letter of Feb. 24, 2003 to David Robinson, Merced County Agricultural Commissioner. California Department of Pesticide Regulation, Worker Health and Safety Branch
17. Fong, H. Letter of March 24, 2003 to David Robinson, Merced County Agricultural Commissioner. California Department of Pesticide Regulation, Worker Health and Safety Branch
18. Fong, H. (2003) Results of a Survey of Small Planet Foods Packing Facility Conducted in Response to Chlorine Dioxide Illnesses, HSM-03002.
19. Fong, H. (2003) Copper Naphthenate Exposure Investigation in Orangevale, Sacramento County, HSM-03005.